

SOIL HUMIDITY SENSOR MP-508B MANUAL



INTRODUCTION & PRINCIPLE

MP-508B sensor can be widely used in soil moisture monitoring, water-saving irrigation, greenhouse control, precision agriculture, road monitoring, hydrometeorology and other fields. It is a soil volume moisture measuring instrument developed by FDR principle. The equipment can be directly used with control instruments, and can also be connected with various data collectors, handheld terminals, etc. For scientific research or irrigation management, mp-508B probe can quickly measure soil moisture by inserting the stainless steel probe into the soil surface or soil profile. 508B water probe can be permanently buried in the ground and connected to a data recorder for long-term measurement.

Frequency domain reflectometry (FDR) is a method to measure the soil moisture content by measuring the frequency change caused by the change of the dielectric constant of the sensor in the soil, which is transformed into the voltage or current relationship corresponding to the soil moisture content. It has the characteristics of high accuracy, fast, accurate, continuous fixed-point measurement, no radioactivity and no disturbance to soil.

TECHNICAL SPECIFICATION

- ◆ Principle: FDR
- ◆ Structure: 4-pin
- ◆ Measuring range: 0~100% ((m³/m³))
- ◆ Response time: <1s
- ◆ Accuracy: ±2% (0~50% (m³/m³), 25°C)
- ◆ Measurement area: 90% of the influence is in the cylinder with diameter of 2.5cm and length of 6cm around the central probe
- ◆ Sealing material: ABS (abrasive tools)
- ◆ Size: 133*40mm (probe: 60mm)
- ◆ Standard line length: 3m
- ◆ Stabilization time: About 10s after power on
- ◆ Farthest lead wire: current 200 m、RS485 100m
- ◆ Ingress Protection: IP65

COMMUNICATION PROTOCOL

1、 Read Data Command

Main engine send command format:

Device address	Function code	Start register address	CRCcheck
xx	03	0000 0001	CRCloCRChi

slave machines response command format:

Device address	Function code	Data length	Data	CRCcheck
xx	03	02	00yy	CRCloCRChi

➤ Example:

➤ Command: FF 03 00 00 00 01 91 D4

➤ Respond: FF 03 02 00 11 51 9C

Soil moisture = 00 11 = 17/10 = 1.7%

2、 Communication specification

9600,8,1,N,N

3、 Unified format of data package

(XX: Device station NO.0X01-0XFF;CRClo CRChi: CRCCheck code low byte first, high byte last)

4、 Write station number command

➤ host machines send command format:

Device address	Function code	Start register address	No. of registers	Data length	Data	CRC check
00	10	0001	0001 02	00xx	CRCloCRChi	(XX=0X01-0XFF)

➤ slave response command format:

Device address Function code Start register address No. of registers CRC check
00 10 0001 0001 CRCloCRChi

➤ Example: (Address changed to 33)

Command 00 10 00 01 00 01 02 00 33 EA 04

Respond 00 10 00 01 00 01 51 D8

5、 Read station number command (fixed command)

➤ slave machines send command format:

Device address Function code Start register address No. of registers CRC check
00 03 0001 0001 CRCloCRChi

➤ slave machines response command format:

Device address Function code Data length Data CRC check
00 03 02 00xx CRCloCRChi (XX=01-ff)

➤ Example: (Address: FF)

Command 00 03 00 01 00 01 D4 1B

Respond 00 03 02 00 FF C5 C4

WIRING METHOD

RS485 output sensor is equipped with 2.5m 4-core cable as standard. Users can customize the cable with appropriate length as required. The cable specification is 0.2mm² 4-core shielded cable, and the wiring color is defined as below:

RS485	
Red	Positive pole
Black	Negative pole
Green	A
Blue	B

Current output sensor is equipped with 2.5m 4-core cable as standard. Users can customize the cable with appropriate length as required. The cable specification is 0.2mm² 4-core shielded cable, and the wiring color is defined as below:

Current output	
Red	Positive pole
Black	Negative pole
Yellow	Current output

OUTPUT:

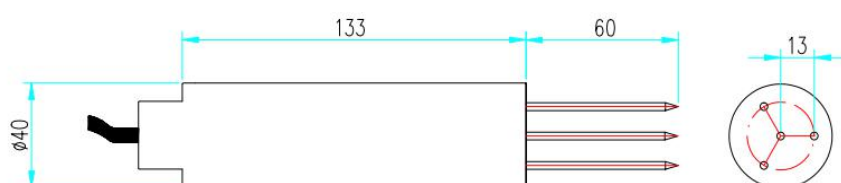
MP-508B/S	MP-508B/485
4-20mA	RS485modbus

Working Voltage: DC12~24V

Working Current: 27mA typical case 50mA MAX

Power Consumption: DC12V \leq 0.6W

SIZE



INSTALLATION

1. The steel pin of the sensor is completely inserted into the soil to be tested, and the sensor can not be shaken when inserting, prevent the sensor probe from being affected;
2. The sensor can be used for multi-layer observation and the establishment of soil moisture monitoring station;
3. When it is felt that there is hard substance in the soil, please select the tested point again to prevent damaging the sensor probe.
4. Do not insert the probe into the hard soil to avoid damaging the probe; during the measurement, the density of the soil shall be as uniform as possible;
5. When moving the sensor out of the soil, do not directly pull the cable; after use, clean and dry the probe to keep it clean
6. If the measurement point is not selected properly, it may lead to unpredictable measurement error ($> 10\%$ vol). Rough installation will lead to the breakage of stainless steel pin of sensor and affect the measurement accuracy. The following aspects must be paid attention to during installation: (1) Abnormal holes or pores. If there are holes or air holes in the sensor's sensing range, the measurement error will be caused, especially when plugging and unplugging the sensor, it is necessary to avoid repeated operation at the same position; (2) Installation angle. In different applications, sensors can be installed in different ways, usually in two ways: horizontal installation and vertical installation. The distribution of water in soil medium is affected by many factors such as space and time. The reasonable

installation of sensor must eliminate these influences to the greatest extent. When the sensor is installed vertically, it measures the average value of water content in the sensing area of nearly 6 cm; (3) Sampling points. The selection

of sampling points must be carefully considered. In addition to the two points mentioned above, there are many other factors affecting the measurement accuracy of the sensor, which can be listed as follows: changes in soil density and composition, gravel, plant roots, earthworm loosening effect, soil drainage state, water volatilization of the soil surface, etc.

7. Due to the different water sources, the water quality will change accordingly. The output value of the measurement voltage will fluctuate within a range when the sensor is placed in a single pure water sample. This measurement value can only be used as a reference value and cannot be used to judge the measurement accuracy of the sensor.

WARRANTY & SERVICE

Warranty commitment: the warranty period is 12 months from the delivery period (except for the product problems caused by the failure to operate according to the corresponding technical requirements or other human behaviors).

After sales commitment: users can consult relevant technical problems by phone and get clear solutions. If it is a quality problem, it can be returned to the factory for maintenance or replacement.

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